PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-140677
(43)Date of publication of application : 23.05.2000

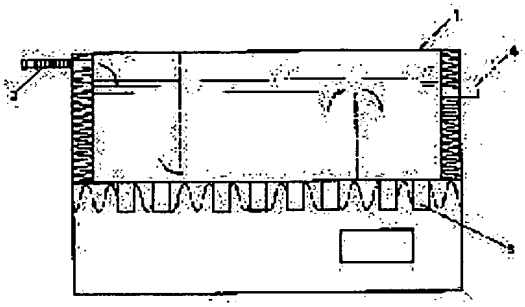
(51)Int.Cl. B02C 19/18
B01F 3/12
B01J 19/10

(21)Application number : 10-350647
(22)Date of filing : 05.11.1998

(71)Applicant : NIPPON SOLID CO LTD
(72)Inventor : HATANO HITOSHI

(54) METHOD OF CRUSHING/MIXING SOLID PARTICLES BY ULTRASONIC WAVES

(57)Abstract:
PROBLEM TO BE SOLVED: To finely crush solid particles in liquid to improve mixing/kneading efficiency of the particles by dispersing the solid particles into liquid to give them vibration by ultrasonic waves.
SOLUTION: Water after flocculating and settling treatment is collected in a sedimentation tank 1, and also active carbon is injected from an injection port 2, and ultrasonic waves are applied from the side bottom surface by an ultrasonic generator 3. Then, by vibration of about 28,000 times/sec by the ultrasonic waves, solid particles are finely crushed to enlarge the total surface area thereof and to rapidly drive out air bubbles stuck on the surface thereof. In this way, since floating property in liquid by fine crushing is excellent and sedimentation is delayed, contact time with the liquid is long, and with a small quantity of active carbon, the mixing/kneading efficiency of particles is improved.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The crushing / mixing approach of the particle characterized by distributing a particle and giving the oscillation by the supersonic wave into a liquid

---

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to crushing in the liquid at the time of using the activated carbon used for water treatment etc., coal, a calcium carbonate, lime, oyster husks, etc., and the mixed kneading approach.
[0002]
[Description of the Prior Art] It subdivides, when using activated carbon etc. conventionally, it is made the shape of fine particles, and mixes or kneads, but handling -- scattering arises -- is bad, and when pouring in especially into a liquid, it is hard to get used and easy to become a lump (insoluble). Therefore, it is the actual condition of using the activated carbon of a large quantity, without the ability a touch area with a liquid not decreasing and raising original effectiveness. Therefore, the bridge phenomenon by plugging etc. occurs for piping etc., and it has been a problem. Moreover, time amount and an effort are applied also to the dissolution and stirring by the machine, and an improvement is desired.
[0003]
[Problem(s) to be Solved by the Invention] this invention person crushed the solid in the liquid, and as a result of coming examination in piles variously about the approach of using more effectively and easily, he came to complete this invention.
[0004]
[Means for Solving the Problem] That is, this invention is the crushing-among liquid mixing approach aiming at obtaining the original effectiveness that crush a particle minutely in a liquid and the effectiveness of mixed kneading of a particle and a particle have it, using a supersonic wave.
[0005] Next, although this invention is explained referring to a drawing, this invention is not limited to the following explanation.
[0006] Drawing 1 is the sectional view having shown the ultrasonic activated carbon underwater shredding equipment in this invention. Water is caught by the setting tank 1 and deodorization decolorization processing of the water after coagulation sedimentation processing is carried out by activated carbon. This activated carbon is not crushed in advance, but it pours in from an inlet 2 as it is, and a supersonic wave is applied from a side base with a sonicator 3. even if it usually compares the oscillation by the supersonic wave with a second with about 6.5 revolutions per second of an agitator in about 28,000 times /, it is markedly alike, and, and since the purge (exfoliation separation) of the air bubbles with which it crushes minutely, and the surface area of the grand total becomes large by this oscillation, and activated carbon adheres to that front face is also performed early, effectiveness effectiveness increases substantially. Moreover, since it excels in floating [in the inside of a liquid] by detailed crushing and sedimentation becomes slow, contact time with a liquid is long and can attain the original object by little activated carbon.
[0007] Next, the result at the time of carrying out ultrasonic stirring using activated carbon is as follows. The activated carbon which cut the coarse powder part by the 710-micrometer screen beforehand was made to distribute underwater, it processed with sonication equipment, and the particle size distribution were investigated. In addition, ultrasonic reinforcement was performed weakly. The measuring method was performed using laser Micron sizer LMS-24 (0.1-700 micrometers of measuring range). As a result, they were the mean particle diameter of 29.2 micrometers, 100.633 micrometers of maximum droplet sizes, and specific-surface-area of 0.350m 2/cm3. In addition, when machine stirring was performed for a comparison, they were the mean particle diameter of 42.2 micrometers, 110.297 micrometers of maximum droplet sizes, and specific-surface-area of 0.236m 2/cm3.
[0008]

[A table 1]

		超音波撹拌	機械撹拌
平均粒径 (μm)		29.2	42.2
最大粒径 (μm)		110.633	110.297
比表面積 (m^2/cm^3)		0.350	0.236
比表面積 (m^2/g)		384,640	387,000
粒子径毎数量	3.9～0.1μm (個/g)	4,672,738	2,382,443
	74～3.9μm (個/g)	4,300,325	2,679,897
	710～74μm (個/g)	2,542	5,052
	計	8,975,605	5,067,392

[0009] As a particle in this invention, activated carbon, coal, a calcium carbonate, lime, oyster husks, etc. are raised.
[0010] As other examples of utilization in this invention, the dissolution of drugs, when using activated carbon as an extender of a tire, it can use.
[0011] Although what is necessary is just to attach to a side base etc. as an approach of installing an ultrasonic device in a new case, when existing and installation are difficult, the thing of a throwing-in mold is suitable and should just change the number, a direction, reinforcement, etc. for the amount of water and object.
[0012]
[Effect of the Invention] This invention can obtain the original effectiveness that crush a particle minutely in a liquid and the effectiveness of mixed kneading of a particle and a particle have it, using a supersonic wave.

[Translation done.]

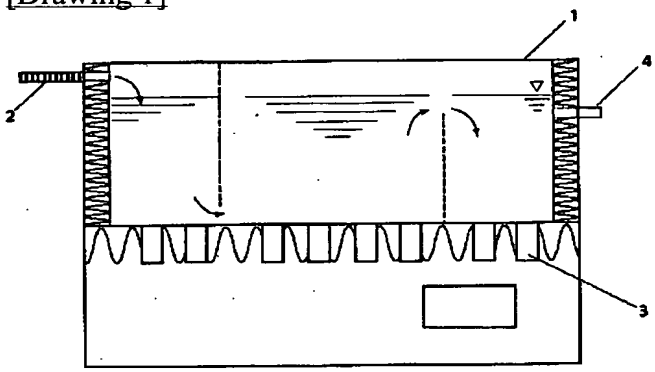
* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Translation done.]

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-140677
(43)Date of publication of application : 23.05.2000

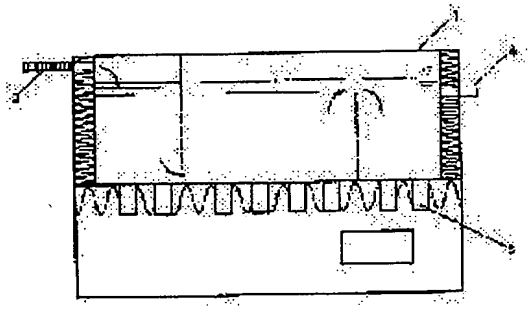
(51)Int.Cl. B02C 19/18
B01F 3/12
B01J 19/10

(21)Application number : 10-350647
(22)Date of filing : 05.11.1998

(71)Applicant : NIPPON SOLID CO LTD
(72)Inventor : HATANO HITOSHI

(54) METHOD OF CRUSHING/MIXING SOLID PARTICLES BY ULTRASONIC WAVES

(57)Abstract:
PROBLEM TO BE SOLVED: To finely crush solid particles in liquid to improve mixing/kneading efficiency of the particles by dispersing the solid particles into liquid to give them vibration by ultrasonic waves.
SOLUTION: Water after flocculating and settling treatment is collected in a sedimentation tank 1, and also active carbon is injected from an injection port 2, and ultrasonic waves are applied from the side bottom surface by an ultrasonic generator 3. Then, by vibration of about 28,000 times/sec by the ultrasonic waves, solid particles are finely crushed to enlarge the total surface area thereof and to rapidly drive out air bubbles stuck on the surface thereof. In this way, since floating property in liquid by fine crushing is excellent and sedimentation is delayed, contact time with the liquid is long, and with a small quantity of active carbon, the mixing/kneading efficiency of particles is improved.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2000－140677
（P2000－140677A）
(43)公開日　平成12年５月23日(2000.5.23)

(51)Int.Cl.⁷	識別記号	Ｆ Ｉ		テーマコード（参考）
Ｂ０２Ｃ　19/18		Ｂ０２Ｃ　19/18	Ｂ	４Ｄ０６７
Ｂ０１Ｆ　3/12		Ｂ０１Ｆ　3/12		４Ｇ０３５
Ｂ０１Ｊ　19/10		Ｂ０１Ｊ　19/10		４Ｇ０７５

審査請求　未請求　請求項の数１　書面　（全　３　頁）

(21)出願番号　特願平10－350647

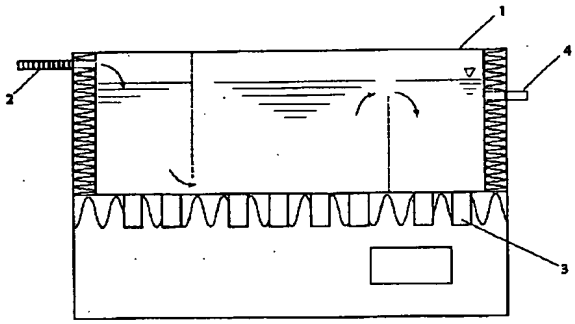
(22)出願日　平成10年11月５日(1998.11.5)

(71)出願人　000229162
日本ソリッド株式会社
東京都港区新橋２丁目16番１号　ニユー新橋ビル５階
(72)発明者　波多野　倫
東京都世田谷区東玉川２丁目33番19号

Ｆターム(参考)　4D067 CE01 GA04 GA20
4G035 AB43 AE13
4G075 AA22 CA23 CA51 EA01 EB01

(54)【発明の名称】　超音波による固体粒子の破砕・混合工法

(57)【要約】
【目的】　本発明は、超音波を用いて、固体粒子を液体中にて微細に破砕し、粒子の混合混練の効率や、粒子の持つ本来の効果をあげることができる。
【構成】　液体中に固体粒子を分散させて超音波による振動を与えることを特徴とする。



1

【特許請求の範囲】

【請求項１】　液体中に固体粒子を分散させて超音波による振動を与えることを特徴とする固体粒子の破砕・混合方法

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、水処理などに利用される活性炭や石炭、炭酸カルシウム、石灰、カキ殻などを使用する際の、液体中での破砕、混合混練方法に関する。

【０００２】

【従来の技術】従来、活性炭などを使用する場合、細分化し粉体状にして混合あるいは混練するが、飛散が生じるなど取り扱いが悪く、特に液体中に注入する場合は、馴染み難く、塊（ママコ）になりやすい。そのため液体との接触面積が減り、本来の効果を上げることができずに、大量の活性炭を利用している現状である。そのために配管などに詰まり等によるブリッジ現象が生起し問題となっている。また機械による溶解や撹拌にも時間や労力がかかり、改善が望まれている。

【０００３】

【発明が解決しようとする課題】本発明者は、液体中で固形物を破砕し、より効果的、かつ容易に利用できる方法について種々検討を重ねてきた結果、本発明を完成するに至った。

【０００４】

【課題を解決するための手段】すなわち、本発明は超音波を用いて、固体粒子を液体中にて微細に破砕し、粒子の混合混練の効率や、粒子の持つ本来の効果をあげることを目的とした液中破砕混合方法である。

2

＊【０００５】次に本発明を図面を参照しながら説明するが、本発明は以下の説明に限定されるものではない。

【０００６】図１は、本発明における超音波活性炭水中破砕装置を示した断面図である。凝集沈殿処理後の水は、沈殿槽１に集水され活性炭により防臭脱色処理される。この活性炭を事前破砕せず、そのまま注入口２より注入し、超音波発生装置３により側底面から超音波をかける。超音波による振動は約２８，０００回／秒と、通常撹拌機の約６．５回転／秒と比しても格段に多く、活性炭は、この振動により、微細に破砕して総計の表面積が大きくなり、且つその表面に付着する気泡の追い出し（剥離分離）も早く行われるために、効果効率が大幅に上がる。また微細破砕により液体中での浮遊性に優れ、沈降がおそくなるため、液体との接触時間が長く、少量の活性炭で本来の目的を達成することができる。

【０００７】次に活性炭を用いて超音波撹拌をした場合の結果は次のとおりである。あらかじめ７１０μmの篩で粗粉部分をカットした活性炭を水中に分散させて超音波処理装置によって処理して、その粒度分布を調査した。なお、超音波強度は弱でおこなった。測定方法はレーザー・マイクロン・サイザーＬＭＳ－２４（測定範囲０．１～７００μm）を用いおこなった。その結果平均粒径２９．２μm、最大粒径１００．６３３μm、比表面積０．３５０m^2／cm^3であった。なお、比較のために機械撹拌を行った場合、平均粒径４２．２μm、最大粒径１１０．２９７μm、比表面積０．２３６m^2／cm^3であった。

【０００８】

【表１】

		超音波撹拌	機械撹拌
平均粒径　（μm）		29．2	42．2
最大粒径　（μm）		110．633	110．297
比表面積（m^2/cm^3）		0．350	0．236
比表面積　（m^2/g）		384，640	387，000
粒子径毎数量	3.9～0.1μm（個/g）	4，672，738	2，382，443
	74 ～3.9μm（個/g）	4，300，325	2，679，897
	710～74μm（個/g）	2，542	5，052
	計	8，975，605	5，067，392

【０００９】本発明における固体粒子としては、活性炭や石炭、炭酸カルシウム、石灰、カキ殻等があげられる。

【００１０】本発明における他の利用例として、医薬品の溶解や、活性炭をタイヤの増量材として使用する場合などにも利用出来る。

【００１１】超音波装置を設置する方法として、新設の場合は側底面等に付設すればよいが既設や設置が難しい場合は、投げ込み型のものが好適であり、その水量や目的により個数や方向、強度等を変えればよい。

【００１２】

【発明の効果】本発明は超音波を用いて、固体粒子を液

体中にて微細に破砕し、粒子の混合混練の効率や、粒子の持つ本来の効果をあげることができる。

【図面の簡単な説明】

【図１】本発明における装置の断面図

【符号の説明】

＊１．沈殿槽
２．注入口
３．超音波発生装置
４．排出口

＊

【図１】